US 20040148324A1

(54) **BLOCK-PARTITIONED TECHNIQUE FOR SOLVING A SYSTEM OF LINEAR EQUATIONS REPRESENTED BY A MATRIX WITH STATIC AND DYNAMIC ENTRIES**

(76) Inventor: **Rajat P. Garg**, San Jose, CA (US)

Correspondence Address:
PARK, VAUGHAN & FLEMING LLP
508 SECOND STREET
SUITE 201
DAVIS, CA 95616 (US)

(57) **ABSTRACT**

One embodiment of the present invention provides a system that uses a block-partitioned technique to efficiently solve a system of linear equations. The system first receives a matrix that specifies the system of linear equations to be used in performing a time-based simulation. This matrix includes a static portion containing entries that remain fixed over multiple time steps in the time-based simulation, as well as a dynamic portion containing entries that change between time steps in the time-based simulation. Next, the system performs the time-based stimulation, wherein performing the time-based simulation involves solving the system of linear equations for each time step in the time-based simulation. In solving the system of linear equations, the system factorizes the static portion of the matrix only once, and reuses the factorization of the static portion in performing an overall factorization of the matrix for each time step of the time-based simulation.